

DESCRIPTION OF THE LARVA AND PUPA OF
CYLORYGMUS LINEATOPUNCTATUS
(COLEOPTERA: HYDROPHILIDAE:
RYGMODINI)

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Abstract.—The larva, pupa, habitat, and distribution of the Chilean water beetle, *Cylorygmus lineatopunctatus* d'Orchymont, are described and illustrated. The larva and pupa are interpolated into previously published keys to the immature stages of hydrophilid beetles.

In late January and through February, 1978, I was able to participate in entomological fieldwork in Chile through the combined auspices of the J. I. Molina Institute of Studies and Publications of Chile and the Smithsonian Institution. During that cooperative project I concentrated my efforts on collecting aquatic Coleoptera, and I was pleasantly surprised to find adults and the larval and pupal stages of the rare rygmotine hydrophilid beetle, *Cylorygmus lineatopunctatus* d'Orchymont. As mentioned previously (Spangler, 1974), *C. lineatopunctatus* is the only representative of the tribe Rygmotini known from South America. All other taxa of the Rygmotini, ca 18 genera and ca 53 species, have been described from New Zealand, the subantarctic islands of New Zealand, or from Australia. Larvae of two rygmotine genera, *Thomosis* and *Namostygnus*, were described recently by Ordish (1974), therefore, the following description adds a third larval description to our knowledge of the Rygmotini. The description of the pupa of *Cylorygmus* given below is the first for any of the rygmotine genera. In addition to describing the larva and pupa of *C. lineatopunctatus*, I am taking this opportunity to summarize and comment on new information on the bionomics and distribution of the species.

The monotypic genus *Cylorygmus* was described by d'Orchymont (1933) from a single specimen which he found among hydrophilids in the Hamburg Museum. The type-species of the genus, *C. lineatopunctatus* d'Orchymont, was a female collected in 1896. Since d'Orchymont's description of the genus and species in 1933, the species was referred to in the literature only five times as follows. Blackwelder (1944) cited *C. lineatopunctatus* in his checklist of Latin American Coleoptera. Moroni (1973) included it in his list of water beetles known from Chile. Spangler (1974) designated a neotype for the type which was destroyed when the Hamburg Museum was damaged during World War II, illustrated the neotype and distinguishing characters,

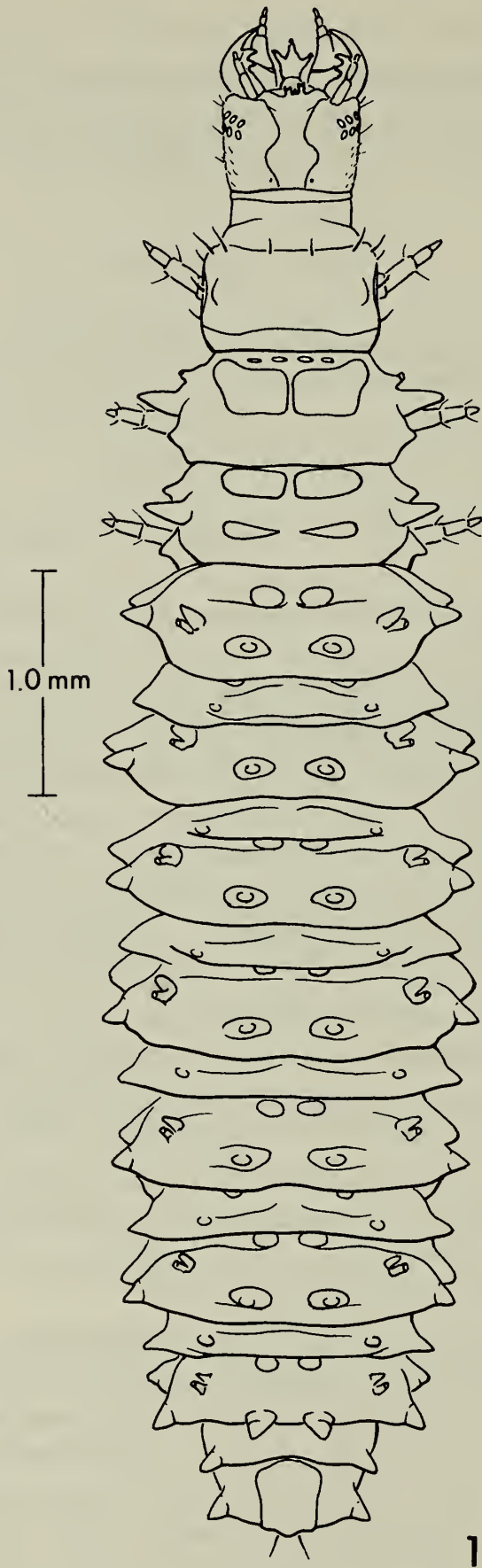


Fig. 1. *Cylorygmus lineatopunctatus* d'Orchymont, larva, habitus view.

and discussed what little was known regarding its bionomics. Camousseight and Moroni (1976) discussed the species briefly, stating that the type was in the Hamburg Museum, not realizing it had been destroyed, and gave locality-data for two specimens in the collections of the Museo Nacional de Historia Natural de Chile. Bachmann (1977) in a section on the Hydrophilidae in a compilation of taxonomic references on the aquatic biota of austral South America, cited d'Orchymont's article in which *C. lineatopunctatus* was described.

The specimens referred to below are either in the U.S. National Museum of Natural History, Smithsonian Institution (USNM) or the Museo Nacional de Historia Natural de Chile (MNHN).

Larva

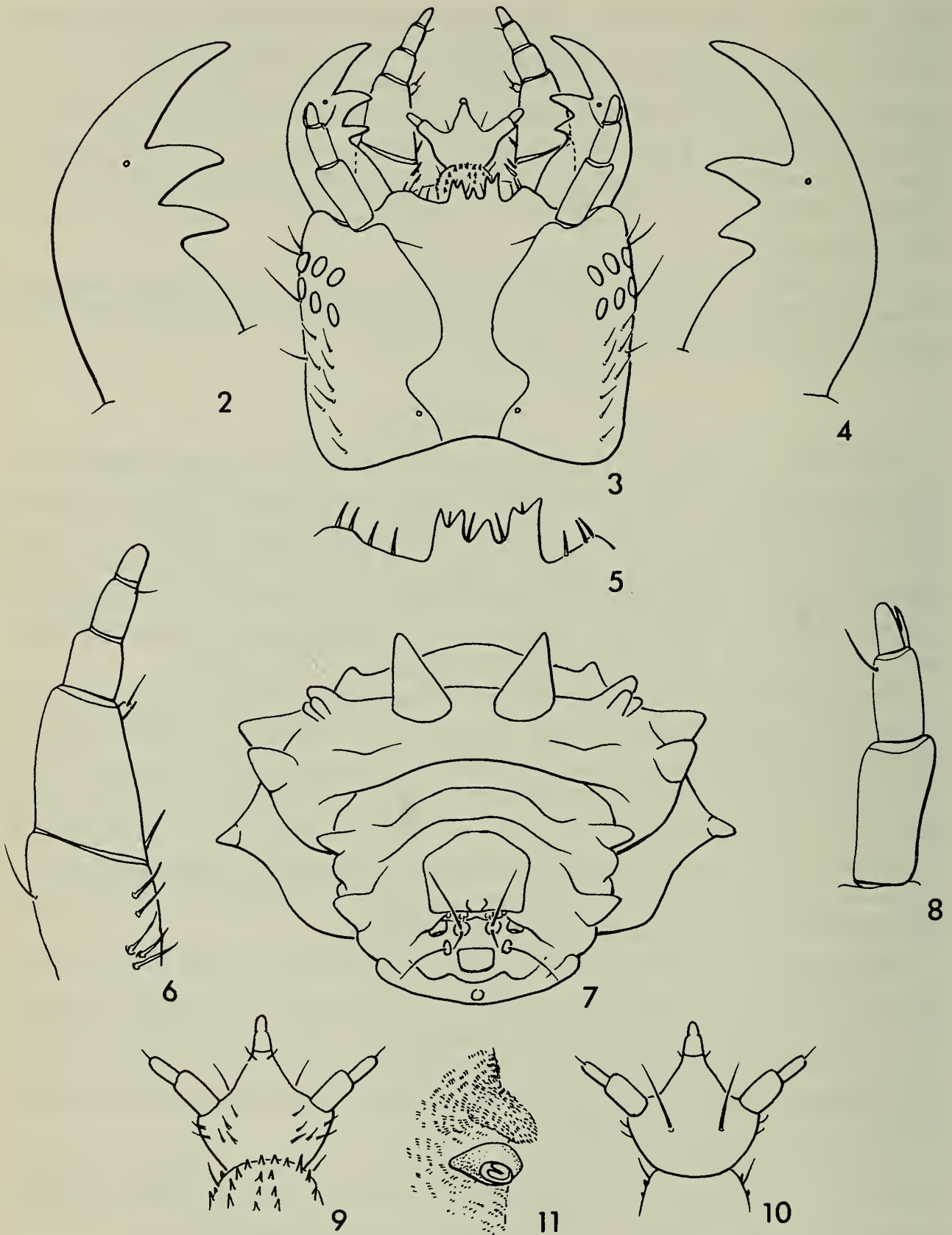
Body (Fig. 1) elongate, slightly compressed dorsoventrally; habitus distinctive because of large tubercles on body. Total length 8.8 mm; greatest width of prothorax 1.0 mm. Color of integument light yellowish brown. Sclerotized head capsule, thoracic terga and sterna, tergal sclerites of abdomen, spiracles, and legs yellowish brown. Integument covered with asperities which are generally oriented transversely except around tubercles and spiracles (Fig. 11) where they are arranged concentrically.

Head quadrangular (Fig. 3); 0.8 mm wide, 0.6 mm from labroclypeus to occipital foramen. Frontoclypeal suture feebly indicated. Frontal sutures widely separated at base of head, therefore, epicranial suture absent. Frons not sagittate (Fig. 3). Cervical sclerites absent. Lateral margins behind ocelli with several (6 to 9) long, stout, yellow setae. Ventral surface of head with numerous seta-bearing punctures laterally and irregular longitudinal row of 8 seta-bearing punctures on discal area on each side of midline; with 2 deep, approximate, posterior tentorial pits behind gula.

Labroclypeus prominent (Fig. 5), almost symmetrical; with 1 narrow medial tooth between 2 broadly rectangular teeth; broad teeth notched apically; left broad tooth slightly shorter than right broad tooth; 4 stout setae present, 1 on medial side of each broad tooth and 1 in notch of each broad tooth. Anterolateral projections of epistoma shorter than teeth; each projection with 3 or 4 stout setae anteriorly.

Ocular areas each with groups of 6 distinct ocelli arranged in an ellipse. Anterior 3 ocelli larger and close to each other; posterior 3 ocelli smaller, ventrolateral one smallest and separated from posteromedial two.

Antenna (Fig. 8) short, cylindrical, and twice as long as stipes; first segment longest, about one-third longer than penultimate segment; penultimate segment with a long slender apicomedial seta and a long moderately stout tubercle, tubercle very closely appressed to ultimate segment, therefore,



Figs. 2-11. *Cylorygmus lineatopunctatus* d'Orchymont: 2, left mandible, dv; 3, head, dv; 4, right mandible, dv; 5, labroclypeus, dv; 6, maxilla, dv; 7, spiracular atrium, dv; 8, antenna, dv; 9, labium, dv; 10, spiracular tubercle, dv; 11, labium, vv. dv = dorsal view, vv = ventral view.

difficult to see; ultimate segment small and slender, about one-half as long as penultimate segment.

Mandibles (Figs. 2, 4) symmetrical, prominent, stout, sharply pointed apically; each mandible with 2 large, well-defined inner teeth and 1 large distal tooth.

Maxilla (Fig. 6) with stipes stout but short, about as long as palpifer; bearing 2 stout apicomedial, 3 basomedial, and 1 apicolateral setae. Palpifer segmentlike; with short, slender, sclerotized appendage on apicomedial angle; appendage about one-tenth as long as palpifer and bearing 2 apical setae. Palpus tapering distally; first segment subequal to penultimate; penultimate segment bearing a small slender seta apicomediaally; ultimate segment shortest, about two-thirds as long as penultimate segment.

Labium (Figs. 9, 10) extending to midlength of palpifer. Penultimate segment of palpus elongate, cylindrical; ultimate segment more slender and slightly shorter than penultimate segment, and bearing an apical seta. Ligula distinct, apparently segmented, subequal in length to labial palpus. Mentum pentagonal; dorsal surface with several short setae laterally and 2 short setae near base of ligula; ventral surface glabrous except for a long slender seta on each side of midline in discal area. Submentum arcuate laterally; narrower than mentum widening posteriorly; dorsal surface with 5 or 6 very coarse spines along anterior edge and 4 irregular, longitudinal rows of spines, 1 row on each lateral margin and a pair paralleling midline; ventral surface glabrous except for a few apicolateral setae.

Gula pentagonal, rounded posteromedially.

Prothorax with sides nearly straight but diverging slightly posteriorly; posterolateral angles broadly rounded; anterior margin with 6 long robust setae, 3 equally spaced on each side of sagittal line; lateral margins each with 3 similar equally spaced robust setae; each lateral margin with a rounded tumescence at midlength; sagittal line present. Prosternal sclerite large, subrectangular; with slightly notched area posteromedially suggesting an incomplete sagittal line; sides of sclerite narrow and extending around sides and into cervical region, apparently uniting on midline.

Mesothorax wider than prothorax and about two-thirds as long (measured on midline) as prothorax; with 4 narrow, transverse, anterior sclerites and 2 large subrectangular mesotergal sclerites with anterolateral angles narrowed and extended anteriorly; each lateral margin with a prominent spiracular tubercle which is preceded by a moderate fleshy tubercle and followed by a very large inverted coneshaped setiferous tubercle; sagittal line present.

Metathorax slightly wider than and as long as mesothorax; anterior metaternal sclerites transverse, larger than posterior sclerites, irregularly rectangular; posterior sclerites transverse, small, narrow; sagittal line present;

each lateral margin with 3 setigerous tubercles, 2 smaller, pleural tubercles, and 1 very large lateromedial tubercle.

Legs four segmented; procoxae large, separated by a distance equal to length of profemur; trochanter about two-thirds as long as femur (viewed ventrally); femur slightly longer than tibiotarsus; tarsal claw single, ventrally without setae.

Abdomen of 8 distinct segments, segments 9 and 10 reduced; terga similar to each other and separated by intersegmental membrane; segments 1 through 7 each with a pair of small, oval, well-sclerotized tergites. True segmentation obscured by additional transverse folds on segments; segmental folds continued onto sternum. Each segment with 2 folds; anterior fold with 8 tubercles, 2 pleural, 2 lateral, 2 pre-spiracular, and 1 on each side of midline; posterior fold with 4 small tubercles, 2 lateral and 2 sublateral. All tubercles densely covered with asperities. A large spiracular tubercle present laterally on segments 1 through 7, each spiracle located laterally and slightly behind a large fleshy setiferous tubercle. Epipleurites and hypopleurites moderately lobed. Eighth tergum represented by superior valve of stigmatic atrium which bears a single large sclerite (Fig. 7), beneath which lies the eighth pair of abdominal spiracles. Ninth tergum with a single, small, medial, rectangular sclerite.

The larva of *Cylorygmus lineatopunctatus* runs to couplet 23 in Bertrand's (1972) key to hydrophilid larvae, but it may be distinguished immediately from the other genera keying to that couplet because it has 3 apicomedial teeth on the labroclypeus instead of the 4 or more reported for the other genera which run to that couplet. Furthermore, the conspicuous tubercles on the abdomen provide the larva of *Cylorygmus* with a distinctive habitus which makes it easy to recognize.

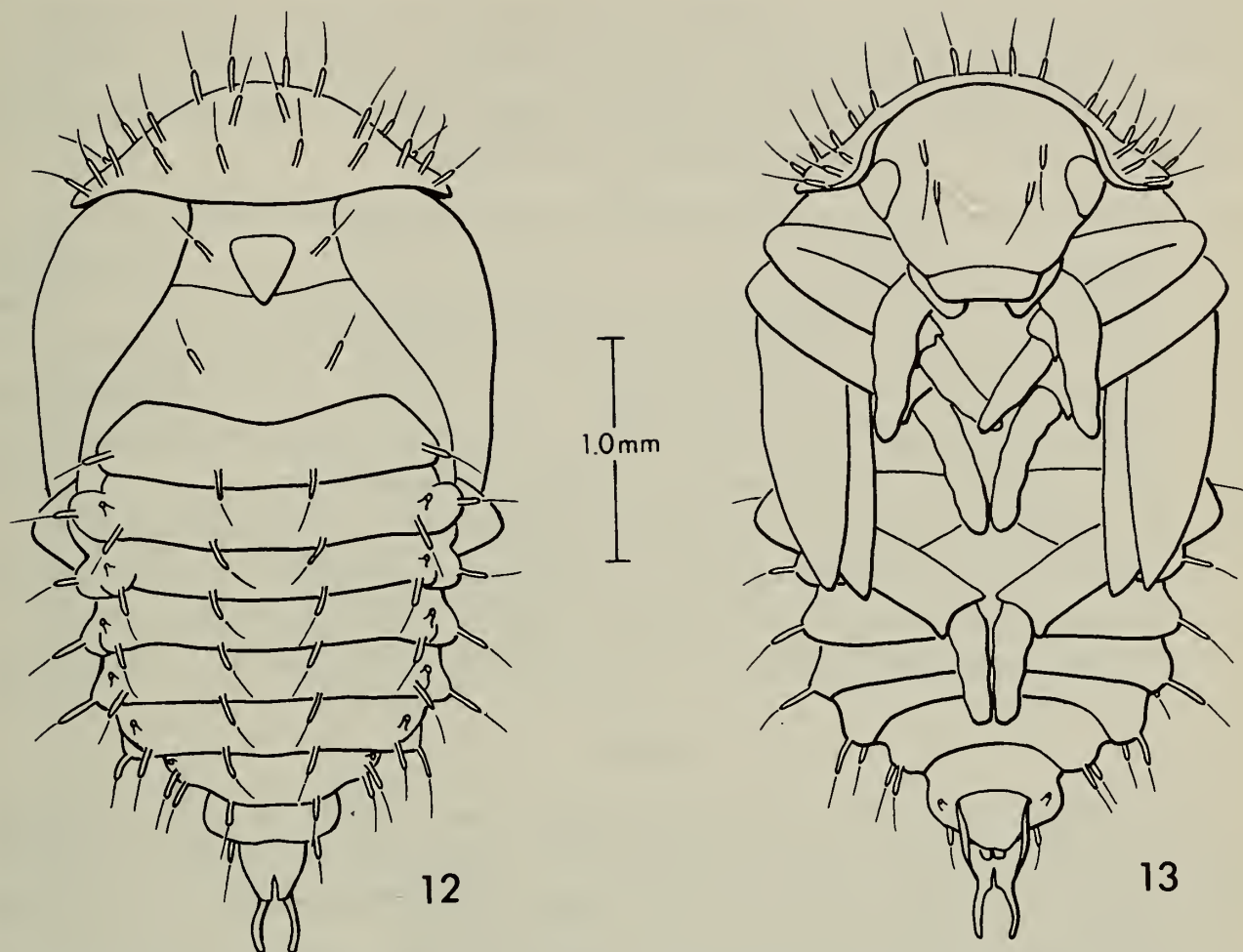
Pupa

Total length 5.0 mm, greatest width 2.7 mm. Color white except styli and cerci yellowish brown. Glabrous except for styli described below.

Head with 2 supraorbital styli above each eye.

Pronotum with 24 styli as follows: 3 on each anterolateral angle, 2 on each side of midline on anterior margin, 3 on each posterolateral angle, 2 on each side of median line at posterior margin and 2 on each side of midline on disc of pronotum. Mesonotum with 2 styli, 1 on each side of scutellum. Metanotum with 2 styli, 1 on each side of midline.

Abdomen with 4 styli on first segment. Segments 2 through 7 each with a pair of pleural and 4 tergal (total 6) styli arranged as follows: 1 pleural stylus lateral to each spiracle, 1 stylus behind each abdominal spiracle, and 1 stylus between each spiracle and midline. Segment 8 with 2 styli on pos-



Figs. 12–13. *Cylorygmus lineatopunctatus* d'Orchymont, pupa; 12, dorsal view; 13, ventral view.

terior margin, 1 on each side of midline. Segment 9 with 2 cerci slightly shorter than basal width of segment 9; each cercus terminating in a moderately incurved apex.

Abdominal segments 1 through 8 each with a pair of spiracles; those on first and eighth segments very reduced.

Antennae and femora extending outward at right angles from body axis. Maxillary palpi extending posteriorly almost parallel to body axis. Tibiae of all legs folded back against their respective femora. Tarsi turned backward and parallel with body axis.

The very large pseudobasal segment of the maxillary palpus, the carinae on the hind tibiae visible through the pupal integument, and the partially developed parameres and median lobe of the male genitalia visible at the apex of the abdomen identify the pupa described above as a male.

The pupa of *Cylorygmus lineatopunctatus* keys to couplet 6 in Bertrand's (1972) key to hydrophilid pupae (i.e., to *Cymbiodyta* Bedel, *Enochrus* Zaitzev, and *Helochares* Mulsant). Because the pupae of these genera are so

similar, no key has been prepared previously to separate them. Furthermore, the three genera each include numerous species, and in most instances the pupa of only one species of each genus is known; so the key presented below must be considered provisional.

- 6a. Middle and hind legs with only four tarsal segments visible; U.S., Mexico, and Europe *Cymbiodyta*
- Middle and hind legs with five tarsal segments visible 6b
- 6b. Basal segment of hind tarsus short but subequal to second segment; maxillary palpi short, robust; Chile *Cylorygmus*
- Basal segment of hind tarsus short, much shorter than second segment; maxillary palpi elongate, slender; cosmopolitan 6c
- 6c. Pseudobasal segment of maxillary palpus with concavity toward the front; mesosternum rarely protuberant or laminate .. *Helochares*
- Pseudobasal segment of maxillary palpus with concavity toward the rear; mesosternum always protuberant or laminate *Enochrus*

Habitat

The single larva of *C. lineatopunctatus* described above was collected from debris removed from a logjam. The 2 pupae and 9 adults found with the pupae were collected from loam caught up in a smaller pile of small logs and driftwood, Both habitats were in midstream. The adults and pupae were found in compacted loam among roots of a weed which held the loam in a matlike fashion.

The Rio Anticura flows through rocks of volcanic origin. Colorimetric water testing methods indicated a pH of 5 and 0 grains of hardness for the river. During the approximately 2 weeks spent collecting in the area the daytime air temperature varied from 54°F to 71°F. The water temperature in the river varied from 44°F to 48°F.

In my previous discussion of *C. lineatopunctatus* (Spangler, 1974), I reported that the adults collected near the beach at Isla Desolacion by Dr. O. S. Flint, Jr., were found as if hibernating in small spaces between roots of mosses and grasses and the rocks he overturned as he searched for insects. These adults were found on 1 and 5 October 1969 which would be early summer at Isla Desolacion and in the Province of Magallanes, Chile. The occurrence of adults alongside rocks as mentioned above and early in the summer suggests that *C. lineatopunctatus* may overwinter in the adult stage. The absence of eggs and presence of a single larva, 2 pupae, and the 9 adults collected in Osorno Province in mid February, at the end of summer in the area, although sketchy evidence, also suggests that the species may overwinter in the adult stage.

The occurrence of adults of *C. lineatopunctatus* among roots of mosses and grasses on the beach at Isla Desolacion agrees reasonably well with the



Fig. 14. *Cylorygmus lineatopunctatus* d'Orchymont, known distribution.

type of habitats reported by Ordish (1974) for three subantarctic rygmidine species, *Namostygmus flemingi* Ordish, *Namostygmus pictus* (Kirsch), and *Thomosis guanicola* Brown. Adults of these species were collected in terrestrial habitats in leaf mold or litter, among plant roots, among sea lion excreta, in seabird nests, and under stones in a penguin colony. Ordish further reported larvae of *T. guanicola* from guano and small plants in penguin colonies.

Distribution

When I published my previous account (Spangler, 1974) of *C. lineatopunctatus*, I had seen only the 12 adult specimens collected by Dr. O. S. Flint, Jr., in Magallanes Province in southern Chile. Since then, I have seen 11 adults, 2 pupae, and 1 larva from two additional localities which considerably increases the known north-south distribution (Fig. 14). The specimens examined (26) are all from Chile as follows. CHILE: Magallanes Province: Fiordo Peel, 1 Oct. 1969, O. S. Flint, Jr., 7 ♂♂, 1 ♀ (neotype-series) (USNM); Isla Desolacion, Puerto Charruca, 5 Oct. 1969, O. S. Flint, Jr.,

2 ♂♂, 2 ♀♀ (paratypes) (USNM). Osorno Province: Puyehue National Park, Anticura, in Rio Anticura, 3 Feb. 1978, P. J. Spangler, 1 larva (USNM); same locality, 12 Feb. 1978, P. J. Spangler, 5 ♂♂, 4 ♀♀, 2 pupae (USNM). Valparaiso Province: Quillota, Feb. 1897, 1 ♂ (MNHN); Quillota, 1 ♂ (MNHN). Moroni (1973) also reported *C. lineatopunctatus* from Santiago Province at Lo Aguila.

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